

Additional Height (Freeboard) above the minimum BFE + 1 foot required by CCR Title 24 – local technical code amendments (Part 2 building and Part 2.5 residential) and floodplain management ordinance text changes

Submit draft ordinances amending the flood provisions of the building code (in <track changes>) for review well in advance of first reading to DWR_NFIP@water.ca.gov or FEMA-NFIP-R9@fema.dhs.gov. Please put community name in subject line.

Before you start: Review the General Instructions for Amending the California Building Standards Code (CCR Title 24) to Adopt Higher Standards for Buildings and Development Located in Flood Hazard Areas.

NFIP Community Rating System Credits. Adoption and enforcement of this higher standard may qualify for CRS points (credits). Communities should review the [CRS Coordinators Manual](#) and consult with their CRS Resource Specialists. FEMA/ISO determines which provisions qualify for points.

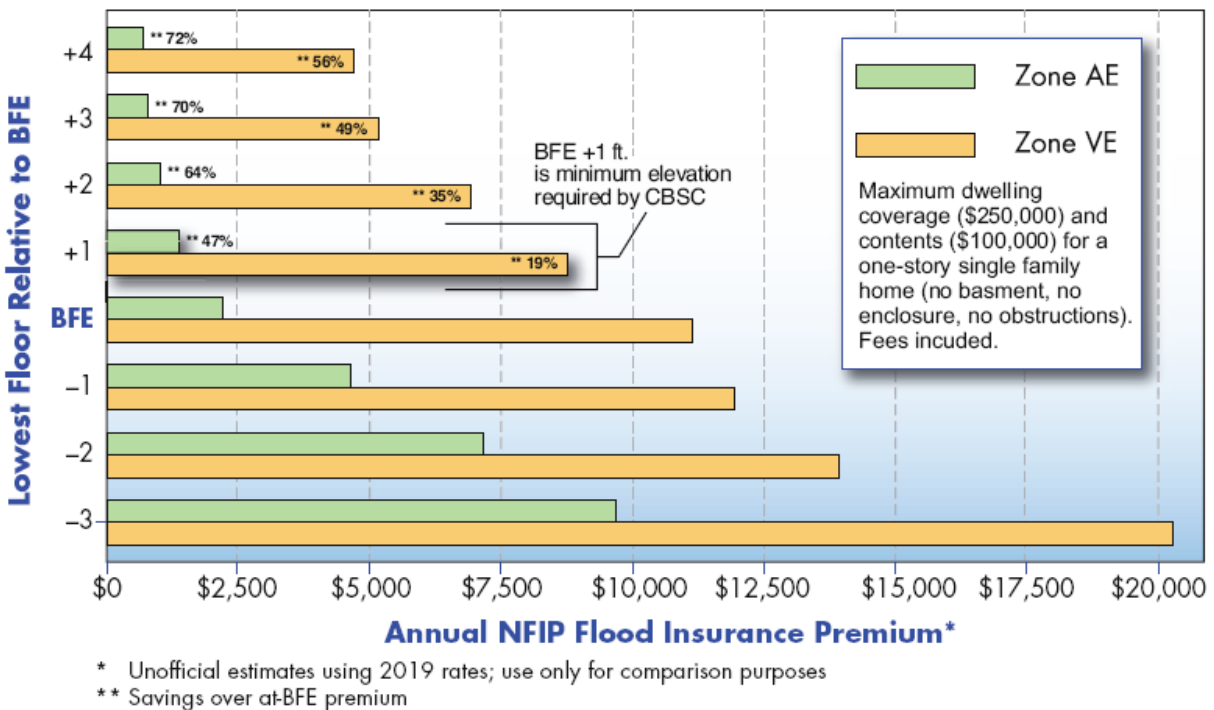
Description*: The term “freeboard” refers to additional height above a minimum level of protection, typically expressed in feet above the base flood elevation (BFE). Freeboard provides a margin of safety for uncertainty in analytical methods and to anticipate future conditions. Floods can and do rise higher than the elevations selected for regulatory purposes. For riverine waterways, continuing development in upstream watersheds will, over time, cause more runoff that may make flooding more severe than depicted on flood hazard maps, especially if the maps are more than a few years old. Future land use conditions, such as increased development and runoff, are not taken into consideration when FIRMs are developed. Similarly, climate changes that may affect sea-level rise, changes in rainfall patterns, and future flood elevations are not reflected in FISs. Adding freeboard helps protect against possible increases in flooding associated with future conditions (see last page for additional reasons).

To reflect the reduced risk associated with higher building elevations, NFIP flood insurance premiums are lower for buildings that are elevated above the BFE. Figure 1 illustrates how elevation influences the cost of NFIP flood insurance.

A common argument opposing requirements to elevate buildings higher than required by the NFIP is the additional cost of higher foundations. The incremental cost to add up

*Reference: [Reducing Flood Losses Through the International Codes: Coordinating Building Codes and Floodplain Management Regulations](#) (5th Edition, 2019), International Code Council and FEMA.

to 4 feet of additional height varies, depending on foundation type, with elevation on fill more costly than other types of foundations. FEMA estimates each foot of freeboard adds between 0.25 and 1.5 percent to the total cost of construction. Analyses show future avoided damage and lower-cost NFIP flood insurance premiums make it cost-effective to build higher. For most buildings built higher than the BFE, the annual insurance savings is enough to recover added costs within several years. Download the FEMA Fact Sheet *Building Higher in Flood Zones: Freeboard – Reduce Your Risk, Reduce Your Premium* at www.fema.gov/media-library/assets/documents/96411.



How Part 2 specifies BUILDING elevations: Part 2 (building) does not specify building elevations in the body of the code. Rather, it is done by reference to ASCE 24, which requires buildings within the scope of the code to be above the BFE as a function of flood zone and risk category. For more information on the existing elevation requirements in ASCE 24, see Section 3.4.3 of [Reducing Flood Losses Through the International Codes: Coordinating Building Codes and Floodplain Management Regulations](#). The amount of freeboard depends on the Flood Design Class assigned in accordance with ASCE 24.

To determine the elevation requirement for a specific building within the scope of Part 2, the designer (and code official) must first determine the flood zone and the Flood Design Class of the building (required by Sec. 1603.1.7), and then use the tables in ASCE

24 to determine the minimum required elevation of the lowest floor (Zone A) or lowest horizontal structural member of the lowest floor (Zone V and Coastal A Zone).

How Part 2.5 specifies DWELLING elevations: Part 2.5 (dwellings) is prescriptive. The minimum elevations are specified in the Sec. R322 and are based on flood zone:

- R322.2.1 (Zone A) specifies the elevation of the lowest floor is at or above the BFE + 1 foot.
- R322.3.2 (Zone V and Coastal A Zones) specifies elevation of the lowest horizontal structural member is at or above the BFE + 1 foot.

How the codes specify FLOOD elevations in “approximate Zone A” without BFEs: Part 2 (building) Sec. 1612.3.1 specifies that where the design flood elevation (which is the same as the BFE in communities that use FEMA’s FIRMs) is not specified, the building official may require use of data from other sources or may require the applicant to determine the DFE. Similarly, Part 2.5 (residential) Sec. R322.1.4.1 specifies that where DFEs/BFEs are not specified, the building official may require use of data from other sources or may require the applicant to determine the DFE. Also see the section of the Model Floodplain Management Ordinance titled “Information in flood hazard areas without base flood elevations (approximate Zone A)” or similar section in locally adopted regulations.

If data from another source are not available, that section of the ordinance specifies the Floodplain Administrator may require the applicant to develop BFE data. Alternatively, the Floodplain Administrator may assume the BFE is not less than 2 feet above the highest adjacent grade at the building footprint – provided there is no evidence indicating flood depths have been or may be greater. This “default” to just 2 feet above grade is allowed by FEMA policy, but must not be used to circumvent knowledge of hazards in every approximate Zone A. If a community wishes to increase the default elevation, additional height may be added here. This is not the same as freeboard, which is done by modifying the requirements that specify how high the lowest floor of a building is relative to the flood elevation.

INSTRUCTIONS

Step 1. Amend Part 2 (all buildings except 1- and 2-family dwellings and townhouses less than three stories). Add a section to the ordinance that adopts local technical amendments to Part 2. To make the changes discernable, maintain strikethrough and

underlining. Because the minimum elevation in ASCE 24 is BFE plus 1 foot (and cannot be reduced), insert the desired total additional height above the BFE plus 1 foot. For example, adopting 2 feet of freeboard would appear in the amendment as “plus 2 feet,” and adopting 3 feet would appear as “plus 3 feet.”

CCR Title 24, Part 2, Section 1612.2 is hereby amended by adding a new section 1612.2.1 as follows:

1612.2.1 Modification of ASCE 24: Elevation requirements. The minimum elevation requirements shall be as specified in ASCE 24 or the base flood elevation plus **{insert total freeboard in feet}**, whichever is higher.

Step 2. Amend Part 2.5 (1- and 2-family dwellings and townhouses less than three stories). Add a section to the ordinance that adopts local technical amendments to Part 2.5. To make the changes discernable, maintain strikethrough and underlining. Because the minimum elevation in R322 is BFE plus 1 (and cannot be reduced), the desired total additional height above the BFE plus 1 foot is indicated. For example, adopting 2 feet of freeboard would appear in the amendment as “plus 2 feet,” and adopting 3 feet would appear as “plus 3 feet.”

CCR Title 24, Part 2.5, Section R322.2.1 is hereby amended as follows:

R322.2.1 Elevation requirements.

1. Buildings and structures in flood hazard areas, including flood hazard areas designated as Coastal A Zones shall have the lowest floors elevated to or above the base flood elevation plus ~~1 foot (305 mm)~~ **{insert total freeboard in feet}** or the design flood elevation, whichever is higher.
2. In areas of shallow flooding (AO Zones), buildings and structures shall have the lowest floor (including basement) elevated at least as high above the highest adjacent grade as the depth number specified in feet on the FIRM plus ~~1 foot (305 mm)~~ **{insert total freeboard in feet}**, or not less than ~~3 feet (915 mm)~~ **{insert total freeboard in feet}**, if a depth number is not specified.
3. Basement floors that are below grade on all sides shall be elevated to or above the base flood elevation plus {insert total freeboard in feet} or the design flood elevation, whichever is higher.

Exception: Enclosed areas below the design flood elevation, including basements whose floors are not below grade on all sides, shall meet the requirements of Section R322.2.2.

Note: Communities with only Zone A need not modify R322.3.2 because it applies in Zone V and Coastal A Zones (if a Limit of Moderate Wave Action appears on the FIRM). Some coastal FIRMs may have LiMWAs delineated even if there is no Zone V, in which case this amendment should be adopted.

CCR Title 24, Part 2.5, Section R322.3.2 is hereby amended as follows:

R322.3.2 Elevation requirements.

1. Buildings and structures erected within coastal high-hazard areas and Coastal A Zones, shall be elevated so that the bottom of the lowest horizontal structure members supporting the lowest floor, with the exception of piling, pile caps, columns, grade beams and bracing, is elevated to or above the base flood elevation plus 4 feet (305 mm) **{insert total freeboard in feet}** or the design flood elevation, whichever is higher.
2. Basement floors that are below grade on all sides are prohibited.
3. The use of fill for structural support is prohibited.
4. Minor grading, and the placement of minor quantities of fill, shall be permitted for landscaping and for drainage purposes under and around buildings and for support of parking slabs, pool decks, patios and walkways.
5. Walls and partitions enclosing areas below the design flood elevation shall meet the requirements of Sections R322.3.5 and R322.3.6.

Step 3. Amend local floodplain management regulations. In the floodplain management regulations, modify the section specifying elevation requirements for replacement manufactured homes in “existing manufactured home parks or subdivisions” (a defined term). In the model ordinance, it is Sec. 304-5 (certain existing manufactured homes). Add the desired additional height to the minimum foundation height (36 inches). Communities may choose NOT to do this, but it is important to realize that omitting freeboard for these “certain” manufactured homes will mean the intended added level of safety and damage reduction afforded by freeboard is not uniformly applied (and may result in fewer Community Rating System (CRS) points for freeboard). NOTE – Part 2 Appendix G requires all manufactured homes to be fully elevated, even in existing parks and subdivisions.

Eliminate the “36 inch” option. Instructions titled Manufactured Home Limitations show how to eliminate the option to allow replacement manufactured homes below the BFE in pre-FIRM parks and subdivisions (as long as the unit being replaced was not substantially damaged by flooding).

Sec. 304-5. - Elevation requirement for certain existing manufactured home parks and subdivisions. Manufactured homes that are not subject to Section 304-4 of these regulations, including manufactured homes that are placed, replaced, or substantially improved on sites located in an existing manufactured home park or subdivision, unless on a site where substantial damage as a result of flooding has occurred, shall be elevated such that either the:

1. Lowest floor, or bottom of the lowest horizontal structural member, as applicable to the flood hazard area, is at or above the base flood elevation.
2. Bottom of the frame is supported by reinforced piers or other foundation elements of at least equivalent strength that are not less than ~~36 inches~~ **{XX*} inches** in height above grade.

**Must NOT be less than 36 inches.*

ADDITIONAL REASONS TO ADOPT ADDITIONAL ELEVATION (FREEBOARD).

- After flood events, buildings that are either above the floodwater or only minimally flooded can be more quickly re-occupied, allowing people to get quickly get back to their homes, businesses, and communities.
- When people get back in their homes quickly, there's less cost burden on government at all levels (and nonprofits) because less temporary housing and other emergency assistance is needed.
- When families and businesses get back more quickly, they more quickly begin spending money locally, thus helping return local tax revenues to more normal levels.
- People not covered by flood insurance have to pay for repairs out of pocket or get Small Business Administration loans (which are not really "low" interest loans). When buildings are higher than the minimum elevation above the BFE, owners are less likely to have to dip into savings or borrow to pay for repairs.
- Several FEMA studies estimated that nearly 1 in 4 small businesses damaged in disasters end up closing for good: build higher and better protected, stay in business.
- Freeboard can be a creditable element in a local floodplain management program that qualifies for the Community Rating System. Communities that participate in the CRS qualify for lower flood insurance premiums in most flood-prone areas.

Reference: [*Reducing Flood Losses Through the International Codes: Coordinating Building Codes and Floodplain Management Regulations*](#) (5th Edition, 2019), International Code Council and FEMA.